NEN-3: OSRP

Detailed Operational Procedure

Approval Cover Sheet

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Title: Assembly Procedure for LANL Special Form Container

Status:	**Hazard:**
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☐ Major revision	☒ Moderate-hazard
☐ Minor revision	☐ High-hazard/complex
☐ Review, no change	**Use Type:**
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	☒ Use every Time

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HISTORY OF REVISIONS

Action	Description
New Document	This document supersedes OSR-OP-190, and incorporates recommendations resulting from the special form certification process at DOT.

Table of Contents

1.0 PURPOSE

This procedure provides instructions for assembly of all Los Alamos National Laboratory (LANL) Special Form Containers (SFCs).

Quality assurance (QA) measurements and initial packaging are performed in accordance with Section 7.0. The tasks required in Section 7.0 will be completed prior to the dispatch of an SFC to the field. Placement of sources in special form capsule, assembly, and closure of the SFC will be completed as described in Section 8.0.

2.0 SCOPE

This procedure applies to the use of SFCs for containment of sealed sources. This procedure is used for closing the SFC models I (LANL Drawing 90Y-219966 (latest revision)), II (LANL Drawing 90Y-219998 (latest revision)) and III (LANL Drawing 90Y-220045 (latest revision)).

3.0 DEFINITIONS AND ACRONYMS

3.1 Definitions

Sealed Source	Radioactive material that is contained in a sealed capsule, sealed between layers of non-radioactive material, or firmly fixed to a non-radioactive surface by electroplating or other means. The confining barrier prevents dispersion of the radioactive material under normal and most accidental conditions related to the use of the source (*from Implementing Guide for Occupational Radiation Protection* (GN5400.9/M1) *Sealed Radioactive Source Accountability and Control*).
Special Form	U.S. Department of Transportation Class 7 (radioactive) material which satisfies the following conditions: 1) it is either a single solid piece or a sealed capsule containing radioactive material that can be opened only by destroying the capsule, 2) the piece or capsule has at least one dimension not less than 5 millimeters (0.2 inches); and 3) it satisfies the test requirements of Code of Federal Regulations (49 CFR 173.469).

3.2 Acronyms

ALARA	As Low As Reasonably Achievable
CVT	Clearance Verification Tool
DOT	U.S. Department of Transportation
IWD	Integrated Work Document
LANL	Los Alamos National Laboratory
OSRP	Off-Site Source Recovery Project
PSDT	Plug Seating Depth Tool
QA	Quality Assurance
SFC	Special Form Container

4.0 Hazards and Controls

This section is intended for LANL personnel performing this procedure. Non-LANL assemblers shall follow their own internal hazard identification and safety procedures including any regulatory requirements within their jurisdiction.

Hazard	Controls
Temperature Extremes	• Drink plenty of fluids in hot climates • Take frequent breaks in cool areas when working in hot climates • Adjust work schedule as needed • Dress appropriately for both hot and cold climates • Take frequent breaks in heated areas when working in cold climates
Handling Materials (Back strains, pinched bruised fingers, foot injuries)	• Before moving or carrying a heavy or bulky object to another location, check the routes to ensure that obstructions and/or slip and trip hazards are removed. Choose an alternate route if clearance is not adequate. • Wear protective gloves as needed • Inspect materials for slivers, jagged or sharp edges, burrs, and rough or slippery surfaces before handling. • Use proper lifting technique to safely lift the load. This includes ▪ Place feet close to load and lift mostly by straightening the legs, keeping the load close to the body ▪ Get a good grip on the load; ▪ Do not twist the back or bend sideways; ▪ Do not lift or lower awkwardly; ▪ Do not lift with the arms extended; ▪ Get mechanical help or help from another person if the load is too heavy. • Wear protective footwear, such as steel-toed shoes when required.
Radiological Hazard (contamination, radiation exposure)	• Communicate with RCT when handling radiological source material • Refer to hold points described in the work plan
External radiation dose	• Record initial and final Electronic Personal Dosimeter readings daily • Wear external dosimetry. The LANL TLD (thermoluminescent dosimeter) is the only dosimeter worn to determine a "dose of record" to photons, beta radiation and low energy neutrons. Dosimeters are obtained from the group dosimetry custodian and distributed based upon enrollment in the dosimetry program using the facility dosimetry matrix. The dosimetry matrix will indicate if a quarterly or monthly exchange period is appropriate. A temporary travel dosimeter and or visitor badge may be issued directly by the dosimetry office.
Radiation Area (exposure to radiation)	• Completion of Radiation Worker II training is required before working in radiological areas. Current RCT qualification is valid equivalent. • At LANL Complete a Radiation Work Permit (RWP) if required. • Follow posted entry and exit requirements.
Contamination Areas (contamination, ingestion, inhalation)	• Completion of Radiation Worker II training is required before working in radiological areas. Current RCT qualification is valid equivalent. • At LANL Complete a Radiation Work Permit (RWP), if required. • Follow posted entry and exit requirements.
Chemicals or chemical products	• MSDSs can be obtained through the LANL Industrial Hygiene and Safety website.

Hazard	Controls
	• At LANL, ChemLog barcodes are applied at chemical receiving or by the chemical owner if delivered without a barcode. • Only personnel authorized by their supervisor and knowledgeable of the effects of hazardous chemicals shall procure and receive chemicals. Individuals with appointments of < 1 year, visitors, UGS, and high school students shall not be chemical owners. • The owner shall annually inspect all chemical containers to ensure that there is a need for the chemical, the container is in good condition, the chemical has not expired, and all labels are in good condition. The annual chemical inventory shall be logged into ChemLog indicating location where each container was located. Empty chemical containers shall be marked "disposed". • Know hazards associated with chemicals used and use appropriate personnel protective equipment or ventilation as necessary
Involves chemicals that are flammable or combustible	• Work Area Specific Training shall be completed to identify the physical and health hazards of the chemicals and to describe the measures employees should take to protect themselves from identified hazards. Protective measures should include appropriate work practices, emergency procedures, and PPE to be used. • Contact Industrial Hygiene and Safety personnel for assistance, as appropriate, in reviewing the MSDS, selecting appropriate PPE, establishing Engineering Controls, developing Hazard Communication Training, etc. • Adequate precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, static, electrical, and mechanical sparks, spontaneous ignition, including heat-producing chemical reactions and radiant heat. • NFPA 30, NFPA 45 and OSHA regulation 29 CFR 1910.106 specify separation and maximum quantities. • Review the Manufacturer Material Safety Data Sheet (MSDS) to identify potential hazards and recommended controls. • Use UL-listed and approved dispensing devices when flammable liquids are dispensed from drums. Bonded wire used when liquids transferred between conductive containers. Refrigerators and freezers labeled "explosion proof", "laboratory safe" or "explosion safe"
Ergonomic injuries	• Ergonomic evaluations of work location are available upon request. • Use proper posture & breaks as needed.
Lead	• Use taped lead whenever possible to minimize direct handling of lead. • Wear proper personal protective equipment (PPE) when handling or moving lead. Proper PPE includes: designated lead gloves when handling bare lead and safety shoes or toe protectors (when handling lead bricks). • Wash hands thoroughly after handling lead.
Slips, Trips, Falls	• Be aware of uneven ground and natural trip hazards while walking. When possible, mark or remove tripping hazards for work areas.

OSRP work conducted at **LANL facilities** shall be governed by this document, an Integrated Work Document (IWD), or facility specific technical/operational procedures.

OSRP work conducted at **off-site facilities** shall be governed by any applicable OSRP operational procedure and any additional site specific regulation/requirements.

It is the responsibility of each organization to determine compliance within the jurisdiction in which the capsules will be used and that work is performed in a safe manner.

5.0 PRECAUTIONS AND EQUIPMENT

5.1 Precautions

Users of these capsules must follow their internal safety precautions and/or the safety precautions required by responsible parties at the location of encapsulation.

Sufficient void volume must be provided in the closed SFC to avoid any potential pressure buildup to unsafe levels. The table below indicates the minimum capsule volume in cubic inches (in^3) (along with minimum void volume %) that must remain void or empty following the loading of sources. This minimum void volume can be assured by measuring the distance in inches from the top of the loaded sources to the bottom of sealing plug. The minimum depth in inches is also provided in the table for the various models.

The Clearance Verification Tool (CVT) for the Model I and III, has been designed to ensure that the space above the source(s) is sufficient to accommodate the tapered sealing plug and to ensure that the required minimum void volume is exceeded. This is verified if the CVT lies flat on the surface of the SFC as specified in this procedure. Pressure should not be applied to the CVT when performing this measurement.

The Model II capsule is designed to use an impact limiting disk and snap ring inside the capsule body to separate the contents from the sealing plug. This design ensures that the space above the source(s) is sufficient to accommodate the tapered sealing plug and to ensure that the required minimum void volume is exceeded.

Therefore, it is unnecessary to estimate the void volume while performing Model I, II or III capsule loading/closing in accordance with this procedure.

SFC Model #	**Usable Capsule Volume** ($in.^3$)	**Usable Internal Diameter** (in.)	**Usable Internal Depth** (in.)	**Minimum Void Volume (will always exceed)** ($in.^3$) or (in. depth) or (%)	**Content Weight Limit (g)**
Model I, Type 2	3.28	1.0	4.18	0.30 or 0.3 or 8.5%	300
Model I, Type 4	0.14	1.0	0.18	0.30 or 0.3 or 77%	80
Model I, Type 5	0.93	1.0	1.18	0.30 or 0.3 or 25.5%	235
Model I, Type 6	1.71	1.0	2.18	0.30 or 0.3 or 16%	390
Model III	7.07	1.5	4.0	0.67 or 0.4 or 8.5%	1000
Model III (long)	15.47	1.5	8.75	0.67 or 0.4 or 4.5%	1700
Model II	26.70	2.0	8.5	0.67 or 0.2 or 3%	2500

Table 1: Basic SFC Dimensions

Users are also responsible for ensuring only permitted metals and alloys which are limited to aluminum, beryllium, copper, copper alloys, brass, brass alloys, bronze, bronze alloys, gold, silver, stainless steels, high nickel and chrome alloys, titanium, vanadium, tungsten, and ceramics (e.g. ceramic fiber packing material) are encapsulated. Lead used as shielding is also acceptable.

Note: All capsules must exclude any plastic, hydrocarbon, or hydrogenous materials homogemously co-mingled with alpha emitters as part of the capsule contents pending additional clarification of limited allowance for plastics which is currently submitted for DOT review.

5.2 Materials and Equipment

- Two 6" C-clamps
- SFC base plate (with Model I & III inserts/adaptors)
- SFC wrench
- Polyethylene ("poly") neutron shielding during assembly (for neutron-emitting sources)
- PSDT (Plug Seating Depth Tool)
- CVT (Clearance Verification Tool for Model I & III)
- Calibrated depth gauge (such as a dial micrometer)
- Special Form Capsule Package (containing container body, threaded cap, sealing plug, and Special Form Capsule Traveler Sheet,)
- Anti-seize lubricant (e.g., Krytox)
- Clean gloves (nitrile)
- Etching tool w/ bit
- Snap ring tools

NOTE: *Verify the existence of and become familiar with each component prior to proceeding.*

6.0 RESPONSIBILITIES

Users of this procedure are responsible for ensuring that the SFCs are assembled in accordance with this procedure and documented correctly on the Traveler Sheet.

If measurements are not within the indicated tolerance, the capsule must be rejected and documented on the SFC Traveler Sheet. The capsule must also be marked with the word REJECTED or similar notation to prevent future use.

7.0 QUALITY ASSURANCE AND PACKAGING

This section specifies the tasks involved in assembling and packaging of the SFCs prior to field use to assure quality. This QA section is completed at LANL prior to shipment of SFC to a work location. For documentation purposes, a SFC Traveler Sheet will be used to record all findings and measurements. This document, when completed, becomes the record for assuring closure in accordance with design requirements. Therefore, legible writing is mandatory.

a. Degrease all parts of the SFC with ethanol to remove any oils or cutting fluids. Ensure ethanol is completely wiped off.

b. Put on a clean pair of gloves.

c. Inspect the tapered sealing plug and mating surface of the container body for scratches, gouges, and nicks. If defects are noted on either part (capsule and/or plug), document the rejection on the SFC Traveler Sheet, the capsule must also be marked with the word REJECTED or similar notation to prevent future use. If no defects are noted, record the findings on the SFC Traveler Sheet, QA Visual results.

d. When using a calibrated depth gauge, zero the instrument by placing it on the PSDT placed on top of the SFC body without cap in place and turning the bezel to align the dial to zero.

NOTE: Always perform depth measurements at the same location/orientation throughout this procedure. Also apply light/even pressure on top of PSDT with one hand while making depth measurements.

e. Record depth gauge serial number and calibration date.

f. Remove the gauge and PSDT and hand-tighten the threaded cap onto the container body.

g. Place the PSDT on the top of the threaded cap and use the depth gauge to measure the gap measurement without the sealing plug in place.

h. Record the results on Line 1 of the SFC Traveler Sheet.

i. Remove the PSDT and threaded cap.

j. Gently insert the sealing plug into the container body. Do not apply pressure to the plug.

k. Hand-tighten the threaded cap onto the container body.

l. Place the PSDT on top of the threaded cap and use the depth gauge to measure the gap measurement with the sealing plug in place.

m. Record the results on Line 2 of the SFC Traveler Sheet.

Note: These two measurements are the baseline measurements that will be used in the field to check that the SFC has been packaged properly and has not been damaged in transit.

n. Complete QA Signature and QA Date lines of SFC Traveler sheet.

o. Remove the PSDT, threaded cap and sealing plug.

p. Wrap the sealing plug securely in bubble wrap. This prevents any marking or scratching during shipment.

q. For packaging purposes, hand-tighten the threaded cap onto the container body.

r. Package the SFC, including all required components, and the SFC Traveler Sheet into appropriate containers and seal in a plastic bag or other packaging to prevent the loss or separation of components.

8.0 ASSEMBLY PROCEDURE

This section specifies the tasks involved in field assembly of the SFC, along with the applicable requirements and performance criteria. All parts of the capsule have been degreased with ethanol, verified using the QA steps above, and enclosed in a sealed package.

8.1 Verification of Special Form Capsule Traveler Sheet (Attachment 1)

Each package includes a SFC Traveler Sheet. This document has been prepared to assure QA compatibility between the SFC body and the sealing plug. QA data is already entered on the traveler sheet prior to assembly. This data was obtained during the QA inspection (Section 7.0 above) when the SFC packages were being initially prepared for use.

a. Open the package and retrieve the SFC Traveler Sheet

NOTE: Compare the revision number of the SFC Traveler Sheet in the package with the revision attached to this procedure. If an older version is found, use the most current revision of the traveler, and attach it to the older original traveler found in the package.

b. Verify that the following information has been entered on the SFC traveler sheet (copy from old traveler revision to current revision, if necessary, and keep the two traveler sheets together):

- SFC identification number.
- QA visual inspection results.
- QA signature
- QA date
- QA gap measurement without plug in place (line 1).

NOTE: This entry is used to determine if an adequate seal has been achieved.

- QA gap measurement with plug in place (line 2).

NOTE: This entry is the gap measured with the plug loosely in place to assure that the plug is adequately over-sized to permit a quality seal to be achieved.

c. Verify that the special form capsule identification number on the SFC Traveler Sheet matches the SFC serial number stamped on the container body.

NOTE: *Lines 5 and 6, "gap measurement after sheer off of nut" and "the difference between line 5 and line 4" are to be completed following the sealing of the SFC. When filling out the SFC Traveler Sheet,* ***write legibly****. When completed, this document is a record of the special form nature of the capsule.*

8.2 Capsule Inspection

a. Put on a clean pair of gloves.
b. Obtain a sheet of muslin cloth from the on-duty RCT and place this cloth on a flat surface. This establishes a clean working surface to place the capsule assembly and PSDT.
c. Verify the following items are available in the package (Figures 1 and 2):

- Sealing plug
- Threaded cap with shear-off knob
- Container body
- Snap ring (Model II only)
- Impact-limiting disk (Model II only)
- Assembly bolt (Model II only)

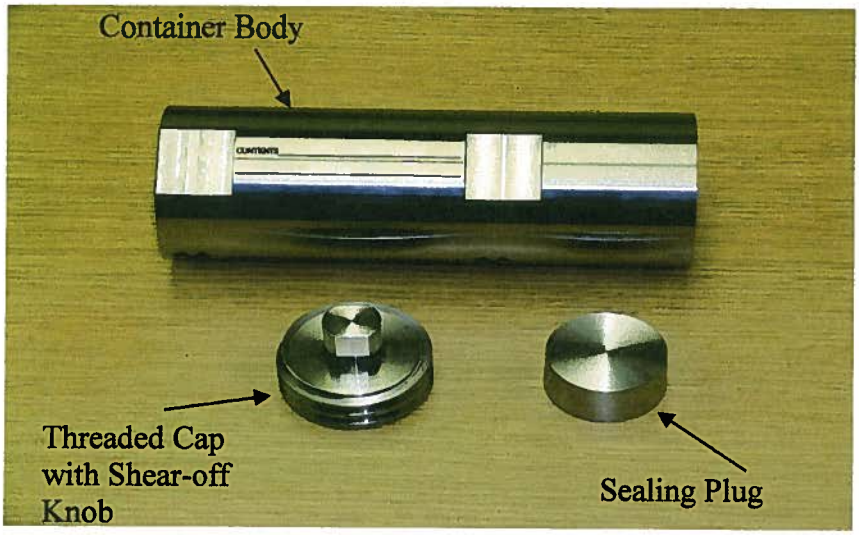

Figure 1: Model I and III Special Form Capsule Components

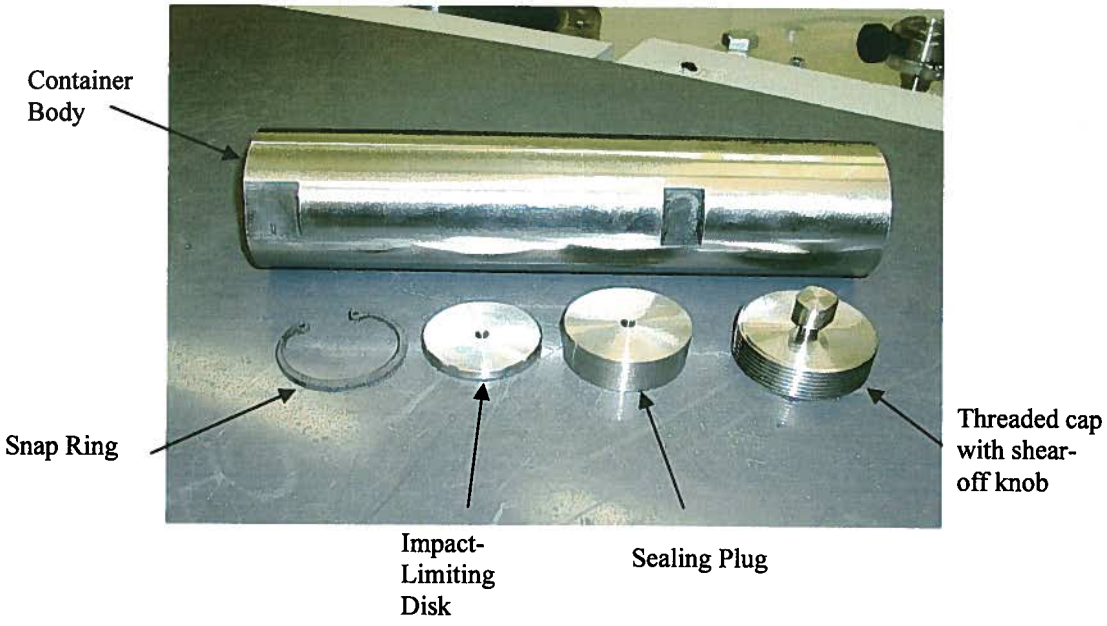

Figure 2: Model II Special Form Capsule Components

d. Inspect the tapered sealing plug and mating surface for scratches, gouges, debris, and nicks. (Figure 3)

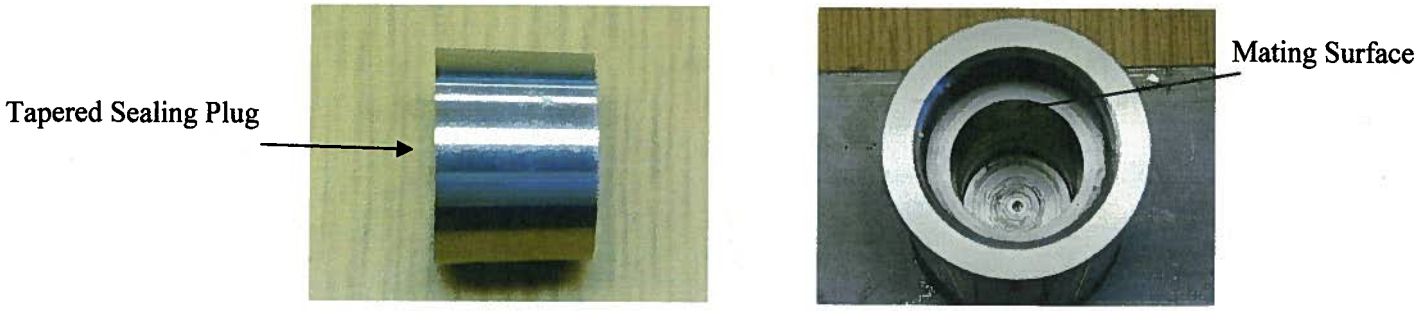

Figure 3: Tapered Sealing Plug and Mating Surface

e. If defects are noted on either part (capsule and/or plug), document the rejection on the SFC Traveler Sheet, the capsule must also be marked with the word REJECTED or similar notation to prevent future use. If no defects are noted, mark "okay" or "OK" on the Field Inspection results line of the traveler, then initial and date the SFC Traveler Sheet under field inspection results. If one of the parts is rejected, it is expected that the remaining parts be preserved for future use.

f. Inspect the threads on the threaded cap and the container body. Assure a proper fit by screwing the threaded cap hand-tight onto the container body.

g. If defects are noted on the threads and there is not a proper fit, reject the capsule, and document the rejection on the SFC Traveler Sheet, the capsule must also be marked with the word REJECTED or similar notation to prevent future use.

h. Verify the QA gap measurements on SFC Traveler Sheet.

- Ensure the depth gauge is calibrated;
- Record the depth gauge serial number and calibration due date on the SFC Traveler Sheet.
- Zero the instrument by placing it on the PSDT then on the SFC body without the cap in place and turn the bezel to align the dial to zero.

  NOTE: Always perform depth measurements at the same location/orientation throughout this procedure. Also apply light/even pressure on top of PSDT with one hand while making depth measurements.

- Remove the depth gauge and PSDT and hand-tighten the threaded cap onto the container body. [It may be useful to make note of the depth gauge set back value when removing it from the SFC body.]
- Place the PSDT on top of the threaded cap and use a depth gauge to measure the gap measurement without the sealing plug in place. (For Model II capsule only) Ensure the depth gage measurement location is near the scribe line on the top of the CAPSULE (not the cap).

- Record field results on Line 3 of the SFC Traveler Sheet.
  (This measurement must be within ± 0.005" of QA measurement (Line 1) for any Model I)
  (This measurement must be within ± 0.010" of QA measurement (Line 1) for any Model II or Model III)

  NOTE: *If measurements are not within the indicated tolerance after troubleshooting, reject the capsule and document the rejection on the SFC Traveler Sheet. Mark the capsule to prevent future use.*

- Remove the depth gauge, PSDT, and threaded cap.

- Gently insert the sealing plug into the container body. Do not apply pressure to the plug.

  Note: For Model II capsules use the assembly bolt to aid insertion and removal of the sealing plug and impact limited disk within SFC body.

- Hand-tighten the threaded cap onto the container body. (For Model II capsule only) Ensure the scribe line on the top of the cap and capsule are aligned.

- Place the PSDT and depth gauge on the top of the threaded cap and use the depth gauge to measure the gap measurement with the sealing plug in place. (For Model II capsule only) Ensure the depth gage measurement location is near the scribe line on the top of the CAPSULE (not the cap).

- Record the field results on Line 4 of the SFC Traveler Sheet.
  (This measurement must be within ± 0.005" of QA measurement (Line 2) for any Model I)
  (This measurement must be within ± 0.010" of QA measurement (Line 2) for any Model II or Model III)

  NOTE: *If measurements are not within the indicated tolerance after troubleshooting, reject the capsule, and document the rejection on the SFC Traveler Sheet. Mark the capsule to prevent future use.*

- Remove the depth gauge, PSDT, threaded cap and sealing plug.

8.3 Assembly

CAUTION: To maintain radiation dose As Low As Reasonable Achievable (ALARA), it is recommended that steps **a.** through **g.** below be completed before any source is moved to the capsule loading area. It is also recommended that all SFC components and tools are lined up in order of their intended use.

a. Using C-clamps, secure the SFC base plate to a suitable surface. An example is shown in Figure 4. Other methods may be used to secure the base plate or to secure the SFC directly.

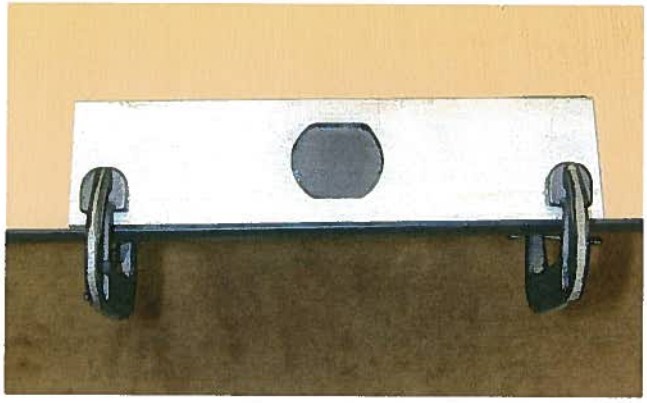

Figure 4: SFC base plate attached to table.

***NOTE**: It may not be possible to determine in advance how many sources will fit in one SFC. If the final activity of the capsule is not known prior to loading, all possible information, except activity, may be etched prior to capsule loading and that ALARA practices are used when later etching the activity on the loaded/sealed capsule.*

b. Record the physical/chemical form, isotope, activity, content weight, location of loading, and the serial number of all verified sources on the SFC Traveler Sheet. If numerous sources are loaded in the capsule, itemize all sources, activities, and weights; and attach a separate sheet to the traveler. **Write legibly, the traveler sheet is a record.**

c. Record isotope and activity on the contents area of the SFC with an etching tool. See Figure 5. If capsule contains no more than 2 sources, etch each source serial/ID number(s). If three or more sources are contained in the capsule, etch the isotope, number of sources, and the total activity. Etch location of loading and initials of assembler.

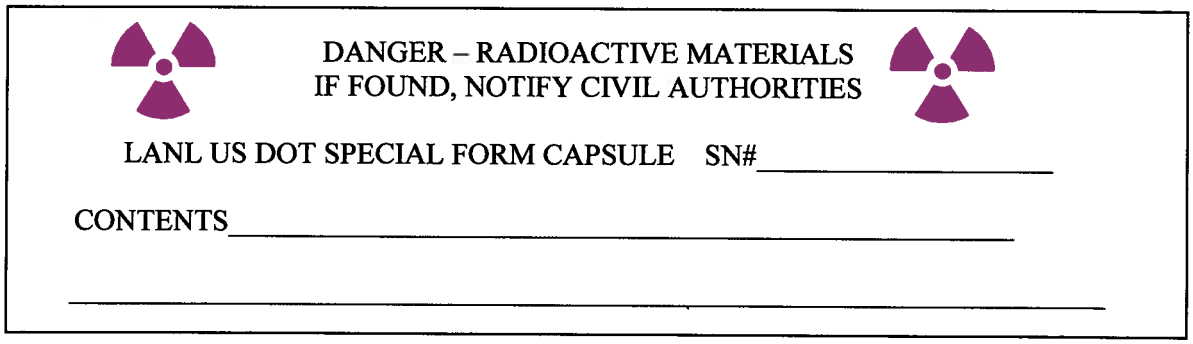

Figure 5: Sample of the space provided on the SFC body for etching.

d. Anti-seize lubricant may be a water based lubricant. Occasionally during storage, water may separate out of the lubricant mixture. To ensure the lubricant is well mixed, massage the tube prior to opening. Check for water by squeezing a small amount of lubricant onto a piece of scrap paper. If clear liquid is observed, place the cap back on the tube and massage again. No clear liquid should be observed before proceeding to the next step.

e. Apply a 1-2 mm dot of anti-seize lubricant to the inlet (bottom) thread of the cap and set aside.

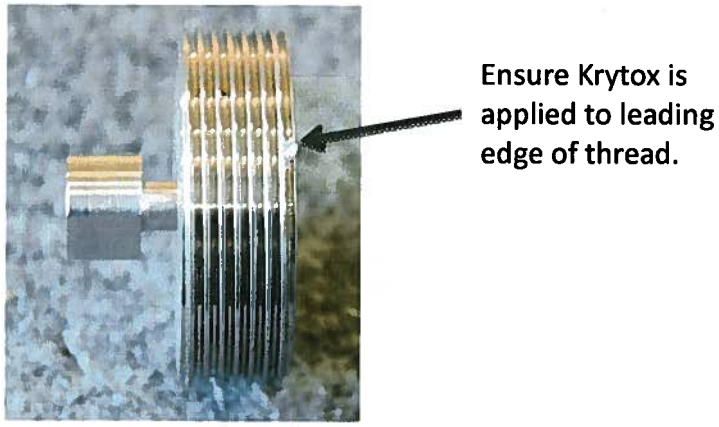

Figure 6. Lubricant on threaded cap

f. Place the SFC container body in the SFC base plate (use Model I or III adaptors if needed). See Figure 7.

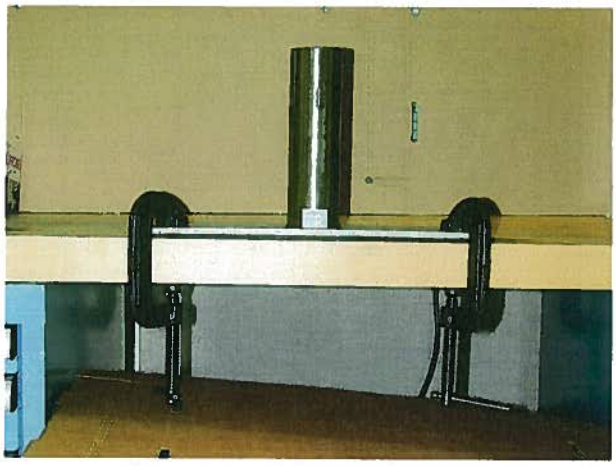

Figure 7: SFC in the base plate.

g. Use shielding in order to maintain dose rates ALARA. Stackable poly shielding is provided in the SFC tool kit for neutron sources. Other shielding options, such as lead-brick should be considered for gamma sources.

h. Transfer the radioactive source(s) to the SFC assembly area and place the source(s) into the SFC container body.

i. Check for proper clearance and verify void volume using the CVT (Model I & III only, as described in Section 5.1). See Figure 8. (If minimum clearance is not achieved, suspend work, place source(s) in a safe configuration, and re-evaluate source loading.) Do not force the CVT into place.

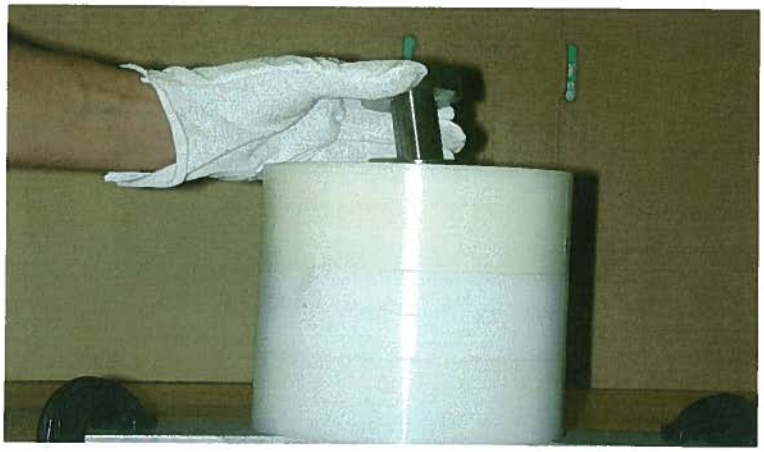

Figure 8: Using the CVT on a shielded Model III SFC.

Model II only (for any Model I or III, skip to step m.)

j. Insert the impact-limiting disk above the source(s) using the assembly bolt.

k. Insert the snap ring - use caution to assure the mating surface is not scratched or nicked.

Figure 9: Snap-ring tool.

***NOTE**: It is suggested that the SFC users practice placement of the snap ring if using the snap ring plier prior to source loading. Practice will improve placement efficiency and therefore worker dose rates will be minimized.*

l. Check for proper clearance. If the snap ring will not seat into the snap ring groove, the minimum clearance has not been achieved. Suspend work, place source(s) in a safe configuration and re-evaluate source loading. If okay, proceed to next step.

All Models (perform the following steps in an efficient manner to minimize dose)

m. Insert tapered sealing plug (narrower end first) into the container body.

n. Hand-tighten the threaded cap onto the container body.

o. Wipe off excess anti-seize lubricant, if necessary.

p. Place the depth gauge and PSDT on top of the cap in the same location/orientation as performed previously, and use the depth gauge to validate the gap measurement with the sealing plug in place, previously recorded on line 4 of the SFC Traveler Sheet. See Figure 10.

Figure 10: Using the PSDT and dial micrometer.

***NOTE**: If this reading is different from the entry on Line 4 of the SFC Traveler Sheet by less than $\pm$0.005" for any Model I; or $\pm$0.010" for any Model II or Model III, the SFC is ready to be sealed. If the reading is not within this tolerance, remove the threaded cap and sealing plug, and inspect for debris and troubleshoot. Replace the sealing plug and threaded cap and then re-measure. If the problem is not corrected after troubleshooting, suspend work, place source(s) in a safe configuration and re-evaluate source loading.*

q. If the tolerance it met, remove the depth gauge and PSDT and proceed to the next step.

r. While the SFC is in the base plate, steadily and smoothly tighten the nut with the SFC wrench until the stem shears off. See Figure 11.

***NOTE:** The nut stem is designed to shear off when sufficient torque has been applied to drive the tapered plug into the capsule body and achieve a proper seal.*

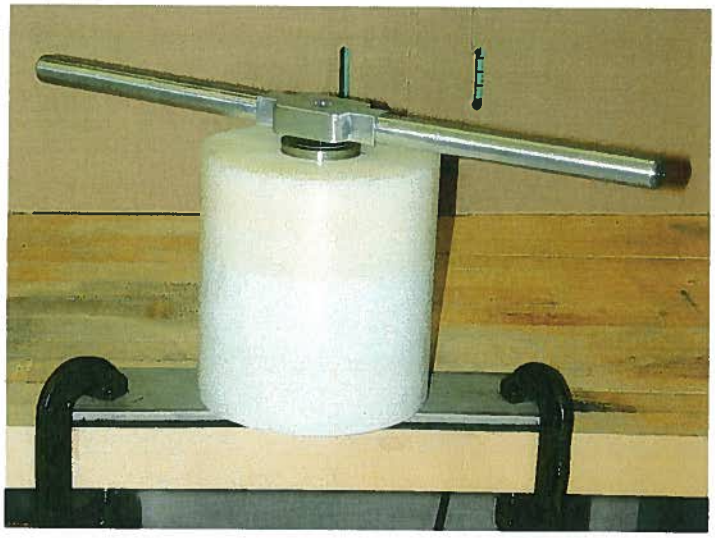

Figure 11: SFC wrench attached to the shielded SFC.

s. Wipe off excess anti-seize lubricant from the top of the SFC, if necessary.

t. With the nut sheared off and the SFC sealed, place the depth gauge and PSDT on top of the SFC in the same location/orientation as performed previously, and again measure the gap with the depth gauge, as in Figure 10. Record this value on line 5 of the SFC Traveler Sheet.

Note: Be aware that there may be debris that interferes with proper seating of the PSDT after nut shear-off. Remove any debris before placing the PSDT on top of the capsule assembly.

u. Remove the depth gauge and PSDT.

v. Record the value on Line 6 of the SFC Traveler Sheet by subtracting line 5 from line 4.

9.0 SEAL VERIFICATION

The special form seal is only acceptable if it meets the following criteria:

a. The gap measured on Line 5 of SFC Traveler Sheet is greater than or equal to the measurement on Line 3.

AND

b. The value on Line 6 is a positive number and greater than or equal to 0.005 inches.

9.1 Special Form Qualification

a. Indicate special form qualification by checking the appropriate certification blocks near the bottom of the SFC Traveler Sheet. Mark an "X" or "✓" in the YES, NO, or N/A column as appropriate.

b. If the seal meets the criteria in Section 9.0, both the trained SFC packager and a verifier must sign and date the SFC Traveler Sheet. The shipper must keep a copy for their records in accordance with 49 CFR 172.201, 49 CFR 173.476, or as required by Item 5.c of USA/0695/S and USA/0696/S.

c. If the seal does not meet the criteria in Section 9.0, or if any NO column is marked in the Special Form Qualification area of the traveler sheet, put the work in a safe condition. Do not continue with capsule packaging. If the seal criterion is not met, the capsule cannot be considered "special form" for transportation or storage purposes.

i. Add a notation to the traveler sheet and SFC body to indicate the item is "Not Special Form."

ii. Remove the loaded SFC/Source assembly to an appropriate (shielded) container following appropriate radiation handling procedures to maintain doses ALARA.

10.0 TRAINING

Workers implementing this procedure shall be qualified for their assigned tasks based upon education, experience, and training. Documentation of training requirements and qualification status for all LANL workers who perform tasks specified in this procedure is maintained through the LANL training program.

Other workers implementing this procedure shall be trained in accordance with this document and any other training deemed necessary by their employer and/or regulator for safe assembly/usage of the capsules described herein. DOT, NRC, DOE, Agreement State, and/or other National Authority's requirements must also be met depending on the jurisdiction at the location of assembly/use.

It is the responsibility of each organization to determine the specific training requirements for those personnel who perform inspection, examination, and testing to verify conformance to specified requirements.

11.0 REFERENCES

49 CFR 172.201 *Preparation and Retention of Shipping Papers*
49 CFR 173.469 *Tests for Special Form Class 7 (Radioactive) Materials*
49 CFR 173.476 *Approval of Special Form Class 7 (Radioactive) Materials*

12.0 ATTACHMENT: Special Form Capsule Traveler Sheet (Form OSR-036)

Special Form Capsule Traveler Sheet

Special Form Capsule Identification number: _____

QA Visual results: _____ Field Inspection results: _____

QA Signature: _____ Field Initials: _____

QA Date: _____ Field Date: _____

Depth gauge S/N: _____ Calibration Due Date: _____

	QA	Field
QA Capsule gap measurement without plug in place:	1._____	3._____
QA Capsule gap measurement with plug in place:	2._____	4._____
Record gap measurement after shear off of nut:		5._____
Subtract line 5 from line 4:		6._____

To achieve a Special Form seal, the measured reading on Line 5 must be greater than or equal to the measurement on Line 3, and the difference on line 6 must be a positive number and ≥ 0.005".

Serial# or ID number of source(s) loaded in SFC: _____
(Attach separate listing if necessary)

Physical/Chemical Form: _____ Isotope(s): _____

Total Activity: _____ Content Weight: _____

Location of loading: _____

Special Form Qualification

Any Criteria listed below marked as "NO" will prevent achievement of Special Form Classification:

Criteria	YES	NO	N/A
Capsule was assembled in compliance with applicable regulations in effect at the time of assembly and in accordance with the correct revision of OSR-DOP-190?			
The capsule seal complies with the requirements of OSR-DOP-190 Section 9.0?			
Void volume was verified by appropriate CVT (Model I & III only)?			

Name of SFC Packager: _____ Organization: _____

Signature of SFC Packager: _____ Date: _____

Name of Verifier: _____ Organization: _____

Signature of Verifier: _____ Date: _____